In pursuit of more affordable electric cars

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New work at Los Alamos National Laboratory will create polymer fuel cells designed to make electric cars less expensive.

The Laboratory is to receive $2.9 million from the Department of Energy and ARPA-E (Advanced Research Project Agency-Energy) for the three-year project.

Other institutions helping the Lab with this project include Toyota, Rensselaer Polytechnic Institute, University of Texas at Austin, University of New Mexico and Xergy Inc.

Currently, fuel cell cars will only run if the engine is hydrated and its operating temperature is below 100 degrees Celsius (212 degrees Fahrenheit). If the internal temperature goes above 100 degrees Celsius, the water will evaporate and the car won't run.

Lowering temperature, going waterless

Laboratory scientist Yu Seung Kim and his team's job is to create a fuel cell that will allow an electric car to run without using water or having to keep the engine as cool.

"I proposed to make a fuel cell that will work above 100 degrees Celsius, up to 230 degrees Celsius (446 degrees Fahrenheit) without using water," Kim said.

Kim said that if they could develop the fuel cells successfully, radiators in electric cars could be smaller, or even eliminated.

According to Kim, a smaller radiator would make the vehicle lighter and less expensive by creating room for the fuel cell stack, which would increase the power by 20-30 percent. Kim added that using the new fuel cell technology would also allow other components such as the humidifier and demister to be removed.

Striving for luxury

The fuel cells will be made of an ion-pair coordinated polymer membrane that is designed to provide a higher rate of proton conductivity across a wide range of temperatures. The new fuel cells also will help increase the power of car.

"We can increase the power to make a Tesla-like fuel cell car," Kim said. "People think of Tesla as a fancy car, and people like to have a fancy car. They have a nice design, power, speed and luxury."

While the new fuel cells will certainly make electric cars fancier, Kim says his goal is to make a fuel cell car that is affordable, as opposed to a battery-powered electric car.

“This will be a very challenging project, but the reward will be great. If successful, this will change the paradigm of fuel cell technology,” Kim said.

> Yu Seung Kim will be discussing this project at Science on Tap at UnQuarked in Los Alamos on Feb. 11 from 5:30pm